

**Notice of Allowability**

Application No.

10/789,445

Examiner

Irakli Kiknadze

Applicant(s)

KIM ET AL.

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Interview Summary of 12/02/2005.
2. ☒ The allowed claim(s) is/are 1,3-16 and 18-36.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 6/28/05;6/9/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 11232005.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other IDS filed 3/1/04.

## **DETAILED ACTION**

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with Susan Morse (Reg. No. 35,292) on December 2, 2005.

3. The application has been amended as follows:

Claim 1, in line 9, " concentration of dopants of the second wafer. " should read -- concentration of dopants of the second wafer; wherein the concentration of dopants of the first wafer and the concentration of dopants of the second wafer are measured using X-ray fluorescence. --.

Cancel claim 2.

Claim 16, in line 10, " concentration of dopants of the second wafer; " should read -- concentration of dopants of the second wafer; wherein the concentration of dopants of the first wafer and the concentration of dopants of the second wafer are measured using X-ray fluorescence; --.

Cancel claim 17.

***Allowable Subject Matter***

4. Claims 1, 3-16 and 18-36 are allowed.

5. The following is an examiner's statement of reasons for allowance:

Claims 1 and 3-15 are allowed because prior art fails to teach or make obvious a method of measuring a concentration of dopants of an objective thin film, comprising: obtaining the concentration of dopants of the objective thin film by subtracting the concentration of dopants of a first wafer from the concentration of dopants of a second wafer, wherein the concentration of dopants of the first wafer and concentration of dopants of the second wafer are measured using X-ray fluorescence as claimed in combination with all elements of claim 1. Claims 3-15 are allowable by virtue of their dependence.

Claims 16 and 18-30 are allowed because prior art fails to teach or make obvious a method of controlling a concentration of an objective thin film, comprising: obtaining a concentration of dopants of the objective thin film by subtracting the concentration of dopants of the first sample wafer from the concentration of dopants of the second sample wafer, wherein the concentration of dopants of the first wafer and concentration of dopants of the second wafer are measured using X-ray fluorescence, determining whether the concentration of dopants of the objective thin film is within a predetermined allowable range of error; continuing a process of depositing the objective thin film when the concentration of dopants of the objective thin film is within the allowable range of error; and modulating the concentration of dopants of the objective

thin film when the concentration of dopants of the objective thin film is outside of the allowable range of error as claimed in combination with all elements of claim 16. Claims 18-30 are allowable by virtue of their dependence.

Claims 31-36 are allowed because prior art fails to teach or make obvious a method of measuring a concentration of dopants of an objective thin film, comprising: forming the objective thin film on the first wafer to form a second wafer; measuring an intensity of a second X-ray fluorescence emitted from the second wafer; obtaining an intensity of a third X-ray fluorescence emitted from the objective thin film by subtracting the intensity of the first X-ray fluorescence from the intensity of the second X-ray fluorescence; and converting the intensity of the third X-ray fluorescence emitted from the objective thin film into the concentration of dopants of the objective thin film as claimed in combination with all elements of claim 31. Claims 32-36 are allowable by virtue of their dependence.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Komiya et al (S Patent 6,040,198), Kim et al. (US Patent

6,815,236 B2), Jones et al. (US Patent 6,248,603 B1), Hossain US Patent (6,173,036 B1), Hossain et al. (US Patent 6,005,915), Noack et al. (6,376,267 B1), Schramm et al. (US Patent Application Publication 2003/0194053 A1), Honda (JP54171038A) and Yun et al. (US Patent Application Publication 2003/0223536 A1) teach method for identification and verification of composition of the thin films formed on the semiconductor wafers.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is 571-272-2493. The examiner can normally be reached on 9:00-5:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Irakli Kiknadze  
December 2, 2005



**EDWARD J. GLICK**  
**SUPERVISORY PATENT EXAMINER**